



# Algorithmic Foundations of Robotics XI [ Selected Contributions of the Eleventh International Workshop on the Algorithmic Foundations of Robotics /

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This carefully edited volume is the outcome of the eleventh edition of the Workshop on Algorithmic Foundations of Robotics (WAFR), which is the premier venue showcasing cutting edge research in algorithmic robotics. The eleventh WAFR, which was held August 3-5, 2014 at Boaziçi University in Istanbul, Turkey continued this tradition. This volume contains extended versions of the 42 papers presented at WAFR. These contributions highlight the cutting edge research in classical robotics problems (e.g. manipulation, motion, path, multi-robot and kinodynamic planning), geometric and topological computation in robotics as well novel applications such as informative path planning, active sensing and surgical planning. This book - rich by topics and authoritative contributors - is a unique reference on the current developments and new directions in the field of algorithmic foundations. .

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**Contenido:** Efficient Multi-Robot Motion Planning for Unlabeled Discs in Simple Polygons -- Navigation of Distinct Euclidean Particles via Hierarchical Clustering -- Coalition Formation Games for Dynamic Multirobot Tasks -- Active Control Strategies for Discovering And Localizing Devices with Range-Only Sensors -- Aggressive Moving Obstacle Avoidance Using a Stochastic Reachable Set Based Potential Field -- Distributed Range-Based Relative Localization of Robot -- Computing Large Convex Regions of Obstacle-Free Space through Semidefinite Programming.- A Region-Based Strategy for Collaborative Roadmap Construction -- Efficient Sampling-based Approaches to Optimal Path Planning in Complex Cost Spaces -- Real-Time Predictive Modeling and Robust Avoidance of Pedestrians with Uncertain, Changing Intentions -- FFRob: An efficient heuristic for task and motion planning -- Fast Nearest Neighbor Search in SE(3) for Sampling-Based Motion Planning -- Trackability with Imprecise Localization -- Kinodynamic RRTs with Fixed Time Step and Best-Input Extension are not Probabilistically Complete.-Featureless Motion Vector-based Simultaneous Localization, Planar Surface Extraction, and Moving Obstacle Tracking -- Sparse Methods for Efficient Asymptotically Optimal Kinodynamic Planning -- Adaptive Informative Path Planning in Metric Spaces -- The Feasible Transition Graph: Encoding Topology and Manipulation Constraints for Multirobot Push-Planning -- Predict Collision Among Rigid and Articulated Obstacles with Unknown Motion -- Asymptotically Optimal Stochastic Motion Planning with Temporal Goals -- Resolution-Exact Algorithms for Link Robots -- Optimal Trajectories for Planar Rigid Bodies with Switching Costs -- Maximum-Reward Motion in a Stochastic Environment: The Nonequilibrium Statistical Mechanics Perspective -- Optimal Path Planning in Cooperative Heterogeneous Multi-robot Delivery Systems -- Composing Dynamical Systems to Realize Dynamic Robotic Dancing.-The Lion and Man Game on Convex Terrains -- RRT-X: Real-Time Motion Planning/Replanning for Environments with Unpredictable Obstacles -- Orienting Parts with Shape Variation -- Smooth and Dynamically Stable Navigation of Multiple Human-Like Robots -- Scaling up Gaussian Belief Space Planning through Covariance-Free Trajectory Optimization and Automatic Differentiation -- Planning Curvature and Torsion Constrained Ribbons in 3D with Application to Intracavitary Brachytherapy -- A Quadratic Programming Approach to Quasi-Static Whole-Body Manipulation -- On-Line Coverage of Planar Environments by a Battery Powered Autonomous Mobile Robot -- Finding a needle in an exponential haystack: Discrete RRT for Exploration of Implicit Roadmaps in Multi-Robot Motion Planning -- Stochastic Extended LQR: Optimization-Based Motion Planning Under Uncertainty -- An Approximation Algorithm for Time Optimal Multi-Robot Routing Decidability of Robot Manipulation Planning: Three Disks in the Plane -- A Topological Perspective on Cycling Robots for Full Tree Coverage -- Towards arranging and tightening knots and unknots with fixtures -- Asymptotically Optimal Feedback Planning: FMM Meets Adaptive Mesh Refinement -- Online Task Planning and Control for Aerial Robots with Fuel Constraints in Winds.-Pebble Motion on Graphs with Rotations: Efficient Feasibility Tests and Planning Algorithms

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